UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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Ref: 8LCR-RC

SENT VIA EMAIL 9/30/20

Mr. Doug Knappe
Colorado Department of Public Health and Environment
4300 Cherry Creek Drive South
Denver, CO 80246
Doug.knappe@state.co.us

Re: Request for Technical Assistance on DACWPF Post-Closure Permit

Dear Mr. Knappe,

The comments and technical review attached to this letter are in response to your technical assistance request made to the EPA Region 8 RCRA Branch to review the Denver Arapahoe Chemical Waste Processing Facility (DACWPF) Post-Closure Permit, EPA ID# COD000695007. The focus of the technical review was on the hydrogeologic conditions in the subsurface at the facility, as well as the groundwater monitoring system required under 40 CFR § 264 Subpart F. This review was conducted by the RCRA Branch hazardous waste permitting team with hydrogeological support provided by the EPA Region 8 Technical Assistance Branch.

Based on the hydrogeological review of the subsurface and the detection monitoring network currently in place at the facility, the system does not meet the requirements of 40 CFR § 264.92, which states:

> *"The owner or operator must comply with conditions specified in the facility permit that are designed to ensure that hazardous constituents under § 264.93 detected in the ground water from a regulated unit do not exceed the concentration limits under §264.94 in the uppermost aquifer underlying the waste management area beyond the point of compliance under § 264.95 during the compliance period under § 264.96..."*

As described in the hydrogeologic review, the upper and intermediate sandstone units should be considered the "uppermost" aquifer and therefore be included in the detection monitoring as required under § 264.98. These upper aquifer units are best positioned to provide for the earliest detection of a possible release from the unit. It is critical that the uppermost aquifers capable of yielding a water sample be monitored as part of the detection well network.

Finally, a review of the adjacent Lowry Landfill Superfund site shows that those well networks are placed in the shallow-most saturated sandstone units for the purpose of detection monitoring. This appears to be the case for similar sites within Region 8 where hazardous waste landfill units are subject

to groundwater monitoring. The DACWPF groundwater monitoring network does not appear to be consistent with nearby landfill units in the same geologic formation or other similar permits within Region 8.

If you have any questions regarding this response to your request, please contact Jesse Newland of my staff at (303) 312-6353.

Sincerely,

Hensley, Amy

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Date: 2020.09.30 10:41:23 -06'00'

Amy Hensley
RCRA Branch Chief
Land, Chemicals and Redevelopment Division

Enclosure

EPA Region 8 Comments on the Denver Arapahoe Chemical Waste Processing Facility (DACWPF) Post Closure Permit

I. Purpose

To conduct a technical review of the DACWPF post closure permit groundwater monitoring system which is mandated in 40 CFR § 264 Subpart F.

II. General Permit Information

DACWPF (permit #CO-20-04-21-01) is a closed hazardous waste landfill in Aurora, CO, currently subject to § 264.310 closure and post-closure care, to include a groundwater monitoring program required under § 264 Subpart F.

III. General Comments

1. For permitted treatment, storage, and disposal facilities (TSDFs), a groundwater monitoring program consists of three phases: (i) detection monitoring (§ 264.98), (ii) compliance monitoring (§ 264.99), and (iii) corrective action (§ 264.100). The phases are sequential with a facility able to move back and forth between phases as certain criteria are met. The regulations establish performance standards that require each facility's groundwater monitoring program to have a sufficient number of wells installed at the appropriate locations. The regulations also require groundwater monitoring wells to be located at depths that can yield representative samples of background conditions and water quality at the point of compliance in the uppermost aquifer (defined at § 260.10 as the geological formation nearest the natural ground surface that is an aquifer, as well as lower aquifers that are hydraulically interconnected with this aquifer within the facility's property boundary).

2. Based on EPA's internal hydrogeologic review of the DACWPF subsurface (see section V), it appears that "…the monitoring well number and locations are insufficient to monitor the uppermost aquifer."

3. The hydrogeologic review states that the upper and intermediate sandstones, as detailed in the post closure permit, are hydraulically connected and should be considered the "uppermost aquifer" per § 264 Subpart F, and therefore should be, per § 264.98, considered the uppermost aquifer and included in the detection monitoring program.

4. It also appears the current monitoring well network (detailed in appendix F of the permit) is insufficient to properly understand, or adequately monitor, the complex subsurface geology below the facility for releases from the landfill. EPA's hydrogeology review states, "…nearby sites also note that drilling locations showed areas lacking groundwater observed during drilling and subsequent sampling events. The geologic setting for those sites is understood to be a fluvial system with preferential flow in connected sands interbedded with silts, clays, and less significant sand lenses. Far more dense monitoring well networks indicate that the sands do not occur in discrete and blocky units as depicted in the cross sections associated with the permit."

5. It would be appropriate to add PFOS/PFOA to the detection list at 70 parts per trillion (ppt), based on the EPA Drinking Water Health Advisory.

IV. Specific Comments

1. *Section 2.0* of the DACWPF permit states: "The monitoring network for the upper and intermediate sandstone units consists of the following:
    a. Piezometers GC-18, GC-21, and P-107, which are completed in the upper sandstone unit and which are illustrated in Figure 6.
    b. Piezometers GC-16, GC-22, and GC-26, which are completed in the intermediate sandstone unit and which are illustrated in Figure 7.
    c. These piezometers have been used to date to monitor groundwater levels in the upper and intermediate sandstone units."

    Comment: This network is insufficient to adequately monitor the uppermost aquifer, i.e. the upper and intermediate sandstone units, to include the number of wells and sampling regiment.

2. *Section 2.2* of the permit states that "the groundwater monitoring well network for post-closure care detection monitoring is designed to detect releases of contamination in the uppermost aquifer at the designated point of compliance and to assess the direction of groundwater flow in the vicinity of the reconstructed cell."
    Comment: Currently the DACWPF detection monitoring network is not actively monitoring the uppermost aquifer as required by § 264 Subpart F.

3. *Appendix G:* Sandstone Units and Leachate Monitoring Plan states that the annual analyzation of the leachate from the DACWPF landfill will determine if compliance monitoring is required.
    Comment: Leachate monitoring can in no way detect a release from the landfill. The point of compliance is at the monitoring wells. The upper and intermediate sandstone units should be monitored as the uppermost aquifer and in compliance with a detection monitoring program. Detection monitoring must be conducted with well sampling and analysis. A minimum of 4 samples per well, semi-annually is required.

4. The groundwater monitoring program under § 264.97(h) requires… "the owner or operator will specify one of the following statistical methods to be used in evaluating ground-water monitoring data for each hazardous constituent which, upon approval by the Regional Administrator, will be specified in the unit permit."
    (1) Parametric analysis of variance.
    (2) Nonparametric analysis of variance based on ranks.
    (3) Tolerance or prediction interval procedure.
    (4) A control chart approach.
    (5) Another statistical test method approved by the EPA Regional Administrator."

    Comment: DACWPF should specify one of the four approved statistical analysis methods listed in § 264.97(h) in the permit and should follow the specific analysis procedure stated in § 264.97(h) for the selected analysis method or DACWPF should use an

alternative method approved by CDPHE so that the analysis results can be easily reviewed and replicated.

V. EPA Regional Hydrogeology Technical Review

Conducted by EPA Region 8's Technical Assistance Branch, Hydrogeology Section
The conclusion of this review is that the monitoring well number and locations are insufficient to monitor the uppermost aquifer. There are four wells, one upgradient, P-112, and three downgradient, P-113, P-114A-R, P-115, that are all noted as screened in the "lower sandstone." The conceptual model for the site identifies three main sand units (upper, intermediate, and lower) in approximately the first 150 feet below ground surface. The upper unit is described in site documents as "perched" which would suggest it is disconnected. However, there is also a drain (the Perched Water Drain, PWD) which collects water from this area and the description of the upper unit suggests that it recharges laterally resulting in flow toward the PWD. That indicates that "perched" is not an accurate description of the shallowest water-bearing sands and they should be considered transmissive and monitored. The "lower unit" may have been targeted for monitoring as the most reliable and substantial paleochannel of the three identified units but it is likely more accurate to consider these sand occurrences as part of the same geologic setting. Though the shallow-most sands may influence regional groundwater flow much less than the lower sands, they still may facilitate meaningful flow and should be monitored to assess potential for leaching or an excursion to occur from the landfill. Additionally, monitoring locations downgradient of the drain could be used to detect if flow may be occurring beyond the drain and to characterize any potential water quality impacts.

The hydrogeologic description and cross sections for nearby sites, Lowry Landfill Superfund Site and Highway 30 Landfill, should be considered and an updated understanding of the local and regional hydrogeology should provide the foundation for selection of additional monitoring well locations. Similar to the description in this Permit, both of these nearby sites also note that drilling locations showed areas lacking groundwater observed during drilling and subsequent sampling events. The geologic setting for those sites is understood to be a fluvial system with preferential flow in connected sands interbedded with silts, clays, and less transmissive sand lenses. Far more dense monitoring well networks indicate that the sands do not occur in discrete and blocky units as depicted in the cross sections associated with this Permit. Additionally, a continuous aquitard or aquiclude does not exist between the depths relevant to the three units identified in this Permit. The sands containing groundwater in the area described as the "upper sandstone" should be monitored in addition to the deeper units targeted by the current monitoring network. Monitoring may also include the flow and quality of water collected by the PWD. This approach would be consistent with the neighboring sites: at Lowry Landfill Superfund Site, the monitoring network includes wells placed in the shallow-most saturated paleochannel sands (https://semspub.epa.gov/work/08/100007654.pdf).

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